

REMARKS

1. Status of Claims

No claims have been canceled, added, or amended, but the claims are nonetheless presented in the foregoing pages for sake of convenience (as is permissible under 37 CFR §1.121).

2. Section 1 of the Office Action: Priority Claim

Please note that this application is filed under 35 USC §371, not under 35 USC §§119(e), 120, or 365(c), and thus it is believed that no identification of the priority applications (as per 37 CFR §1.78) is needed at the outset of the application. If it is still believed by the USPTO that the first page of the specification must be amended to set forth a priority claim, kindly indicate where the CFR and/or MPEP require such a statement.

3. Sections 2-9 of the Office Action: Claim Rejections

It appears that the claim rejections address the claims as set forth in the originally-filed PCT application (as reflected in WO 2004/024316). Unfortunately, these claim rejections are moot, since the claims considered in the Office Action have been amended. In short, *it appears that the true current claims have not been examined, and that the Office Action does not consider the true current claims* (which are set forth at the outset of this Response). To review the claim history:

- In an International Search Report dated February 12, 2004 (*copy attached*), Officer Kishor Mayekar of the International Searching Authority (ISA) cited WO 99/47230 – which is also cited in the present Office Action – as being potentially relevant to the claims as set forth in the originally-filed PCT application (as reflected in WO 2004/024316).
- In an Article 34 Amendment filed April 7, 2004 (*copy attached*), the claims were amended and replaced by claims 1-10 to better emphasize their novelty and unobviousness in view of WO 2004/024316.

- In an International Preliminary Examination Report dated June 2, 2004 (*copy attached*), Officer Kishor Mayekar of the International Preliminary Examining Authority (IPEA) indicated that amended claims 1-10 appeared novel and unobvious in view of WO 2004/024316.
- The application was then filed under 35 USC §371 on March 7, 2005.
- Subsequently, on June 15, 2005, a Preliminary Amendment was submitted to add new claims 11-20 to the aforementioned claims 1-10. (All of these claims 1-20 are now set forth at the outset of this Response.) It is noted that while the USPTO indicated that it received the Preliminary Amendment, the Preliminary Amendment is not visible on the PAIR records for this application, and it appears that the Preliminary Amendment may have been lost or otherwise misplaced. A request to accept and enter the Preliminary Amendment subject to 37 CFR §1.8(b) is filed concurrently with this Response.

Thus, the current claims are those set forth in the June 15, 2005 Preliminary Amendment (and those set forth at the outset of this Response), *not* the claims considered by the Office Action. It is believed that the current claims are allowable because:

- They are not subject to the §112(2) issues raised by the Office Action;
- Independent claim 1 (and its dependent claims 2-10) are the same as those indicated by Officer Kishor Mayekar as being allowable over WO 2004/024316 in the June 2, 2004 International Preliminary Examination Report. Also note that independent claim 1 resembles claim 12 of the original claims, which is now indicated as allowable by the Examiner;
- Independent claim 11 resembles claim 21 of the original claims, which is now indicated as allowable by the Examiner.

If it is believed that the claims are subject to any issues that would prevent allowance, do not hesitate to call the undersigned attorney to discuss any matters that may assist in expediting resolution.

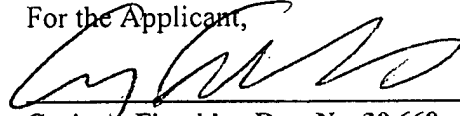
4. In Closing

Telephone calls related to this application are welcomed and encouraged. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

ATTACHMENTS / ENCLOSURES:

- February 12, 2004 International Search Report
- April 7, 2004 Article 34 Amendment
- June 2, 2004 International Preliminary Examination Report
- June 15, 2005 Preliminary Amendment

For the Applicant,



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/27645

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B01J 19/08

US CL : 204/164-169, 172; 219/60R; 422/186.04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 204/164-169, 172; 219/60R; 422/186.04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/47230 B (ZADIKARA et al.) 23 September 1999, see abstract, Fig. 2, -3, page 3, lines 27-32, page 10, lines 17-29, page 14, lines 27-30, page 15, lines 27-32 and page 19, lines 14-16.	1-3, 6, 13, 15
Y		7-10, 16-20
Y	US 6,284,105 B1 (ELIASSON et al.) 4 September 2001, see abstract, Figs. 1-3, col. 5, lines 27-64, col. 6, lines 6-49 and col. 10, lines 6-13.	1-30



Further documents are listed in the continuation of Box C.



See patent family annex.

Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

22 January 2004 (22.01.2004)

Date of mailing of the international search report

12 FEB 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Kishor Mayekar

Telephone No. (571) 272-1300

April 7, 2004 Article 34 Amendment

**IN THE PCT INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY
(U.S. Patent and Trademark Office)**

International Application of: DENES et al.
INTERNATIONAL APPLICATION NO.: PCT/US03/27645
International Filing Date: 04 September 2003
For: **PLASMA TREATMENT WITHIN
DIELECTRIC FLUIDS**
Priority Date: 10 September 2002
Applicant's or Agent's File Reference: 09820.252

ARTICLE 34 AMENDMENT

International Preliminary Examining Authority
Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

April 7, 2004

Attention: Authorized Officer - Kishor Mayekar

To the Examining Authority:

Pursuant to Article 34(2)(b) and PCT Rules 66.1(b) and (d), the Applicant hereby submits amendments to the claims. These amendments are submitted concurrently with a Demand for international preliminary examination for the above-identified international application, and are intended to be used in part when drafting any Written Opinion or International Preliminary Examination Report. A replacement sheet is enclosed for every sheet of the PCT application containing an amendment (Rule 66.8). Three copies of the replacement sheets are provided. Please replace existing sheets 12-16 with the replacement sheets 12-13 attached hereto. To summarize the amendments, all prior claims are replaced by new claims 1-10 wherein:

- New claim 1 rewrites claim 22 to more specifically indicate that the plasma treatment occurs in a fuel line upstream from an internal combustion engine, and finds support particularly at page 5 line 29-page 6 line 9.

I certify that this correspondence is being deposited with the United States Postal Service as Express Mail - Post Office to Addressee, in an envelope addressed to: International Preliminary Examining Authority, Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

EV314814462US

Express Mail Label No.

4-7-04

Date of Deposit

M. Quinn Layton

Signature

- New claim 2 is directed to increasing the fuel flow path to increase the time that the fuel is subjected to treatment, and finds support at page 7 lines 23-26 and page 8 lines 12-15.
- New claim 3 is directed to increasing the surface area of the flow path to provide more nucleation/evaporation sites for bubbles, and finds support at page 7 lines 26-29.
- New claim 4 is directed towards the beads discussed at page 7 lines 23-29.
- New claim 5 is directed towards the catalytic beads discussed at page 8 lines 1-2.
- New claim 6 rewrites claim 27.
- New claim 7 is directed towards the use of exhaust gas to generate bubbles, and finds support at page 6 lines 4-6.
- New claim 8 rewrites claim 28.
- New claim 9 rewrites claim 29.
- New claim 10 rewrites claim 30.

REMARKS

The new claims address an invention similar to the one of prior claims 22-30, for which the International Search Report states that U.S. Patent 6,284,105 is of particular relevance. U.S. Patent 6,284,105 is directed to a plasma-aided process for cracking hydrocarbons in refinery processes (see, e.g., column 2 lines 49-67). The hydrocarbons may be liquids or two-phase liquid-vapor mixtures (see column 5 lines 20-40). Three refinery processing arrangements are depicted in the Figures and described at column 8 line 24 onward:

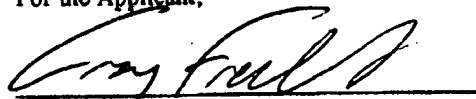
- (1) In Fig. 1, hydrocarbon flows in an annular region 5 between electrodes 2 and 3 (wherein electrode 2 is insulated at 4), with the electrodes generating plasma in the hydrocarbon therebetween;
- (2) In Fig. 2, hydrocarbon flows in region 5 between plate-like electrodes 2 and 3 (wherein electrode 2 is insulated at 4), with the electrodes generating plasma in the hydrocarbon therebetween;
- (3) In Fig. 3, hydrocarbon flows in an annular region 5 between electrodes 2 and 3 (wherein electrode 3 is insulated at 4, and wherein catalyst 6 is present), with the electrodes generating plasma in the hydrocarbon therebetween.

The present claims are believed novel and to contain an inventive step in comparison to U.S. Patent 6,284,105. Initially, the claimed process is performed in the fuel line of an internal combustion engine, and this feature is neither present in, nor in any way suggested by, U.S. Patent 6,284,105, which relates to refinery processes. No artisan would expect refinery processes to be directly implemented in the fuel line for an internal combustion engine owing to the cost, complexity, and byproducts of such processes. If the situation was otherwise, one would expect that such processes would be in use since unrefined petroleum, which is naturally less expensive than the refined fractions of petroleum, would then be readily and directly usable as fuel. When U.S. Patent 6,284,105 is considered objectively from the perspective of an ordinary artisan who has no knowledge of the present invention, it is seen that there is no suggestion that the process of U.S. Patent 6,284,105 could be beneficially implemented in the fuel line of an internal combustion engine, or even that such an implementation might be possible.

Further, the present claims describe plasma generation within bubbles, a step which is not described in U.S. Patent 6,284,105. U.S. Patent 6,284,105 does discuss plasma treatment of two-phase liquid-vapor flow of hydrocarbons, but a two-phase flow does not require bubbles entrained within liquid (for example, it can encompass liquid and vapor phases which travel in separate layers adjacent each other). It is particularly notable that U.S. Patent 6,284,105 makes no mention of the advantages of bubbles - the fact that bubbles provide a high surface area liquid/vapor interface at which plasma treatment may occur, as discussed at page 7 lines 18-20 of the present application - which implies that bubbles are not contemplated by U.S. Patent 6,284,105.

Any questions or comments concerning the above-referenced application should be directed to the undersigned.

For the Applicant,



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ATTACHMENTS:

- Replacement Pages 12-13
(THREE COPIES)

Claims

What is claimed is:

- 5 1. A plasma treatment method comprising the step of subjecting a portion of a fuel line for an internal combustion engine to an electric field, wherein
 - a. the fuel line contains a liquid fuel having gas bubbles therein, and
 - b. the electric field generates plasma within the bubbles,with the fuel line subsequently providing the liquid fuel to a combustion chamber of the internal combustion engine.
- 10 2. The plasma treatment method of claim 1 wherein the interior of the fuel line has obstacles formed therein within the path of fuel flow, whereby the length of the path of fuel flow is made greater than the corresponding length of the fuel line.
- 15 3. The plasma treatment method of claim 1 wherein the solid surface area within the interior of the fuel line is greater than the solid surface area of the exterior of the fuel line.
- 20 4. The plasma treatment method of claim 1 wherein the fuel line contains beads therein.
5. The plasma treatment method of claim 4 wherein the beads are formed of catalytic materials.
- 25 6. The plasma treatment method of claim 1 wherein the gas bubbles contain the liquid fuel in vaporized form.
- 30 7. The plasma treatment method of claim 1 wherein the gas bubbles contain exhaust gas emitted by the internal combustion engine.

8. The plasma treatment method of claim 1 further comprising the step of increasing the temperature of the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.
- 5 9. The plasma treatment method of claim 1 further comprising the step of reducing the pressure of the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.
- 10 10. The plasma treatment method of claim 1 further comprising the step of ultrasonically exciting the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
CRAIG A. FIESCHKO
DEWITT ROSS & STEVENS S.C.
8000 EXCELSIOR DRIVE
MADISON, WI 53717-1914

PCT

**NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

(PCT Rule 71.1)

Date of Mailing
(day/month/year) **02 JUN 2004**

Applicant's or agent's file reference

09820.252 PC

IMPORTANT NOTIFICATION

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US03/27645

04 September 2003 (04.09.2003)

10 September 2002 (10.09.2002)

Applicant

WISCONSIN ALUMNI RESEARCH FOUNDATION

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US

Mail Stop PCT, Attn: IPEA/US
Commissioner for Patents
P.O. Box 1450
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Facsimile No. (703) 305-3230

Authorized officer

Marian Knode

Telephone No. 571-272-1700

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 09820.252 PC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/27645	International filing date (day/month/year) 04 September 2003 (04.09.2003)	Priority date (day/month/year) 10 September 2002 (10.09.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): B01J 19/08 and US Cl.: 204/164-169, 172; 219/60R; 422/186.04		
Applicant WISCONSIN ALUMNI RESEARCH FOUNDATION		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>2</u> sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 		
Date of submission of the demand 07 April 2004 (07.04.2004)	Date of completion of this report 13 May 2004 (13.05.2004)	
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Kishor Mayekar Telephone No. (571) 272-1300	

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US03/27643

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed.
- ☒ the description:
pages 1-11 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the claims:
pages NONE, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages 12-13, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the drawings:
pages 1, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☒ the claims, Nos. 11-30
- ☐ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under Item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/27645**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

Novelty (N)	Claims 1-10	YES
	Claims NONE	NO
Inventive Step (IS)	Claims 1-10	YES
	Claims NONE	NO
Industrial Applicability (IA)	Claims 1-10	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-10 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest in a method for treating a liquid fuel in a fuel line for an internal combustion engine by plasma comprising the step of subjecting a portion of the fuel line to an electric field, wherein the fuel line contains the liquid fuel having gas bubbles therein and the electric field generates plasma within the bubbles, with the fuel line subsequently providing the treated liquid fuel to a combustion chamber of the internal combustion engine.

Claims 1-10 meet the criteria set out in PCT Article 33(4), and thus the industrial applicability because the subject matter claimed can be made or used in industry.

----- NEW CITATIONS -----

Claims

What is claimed is:

- 5
1. A plasma treatment method comprising the step of subjecting a portion of a fuel line for an internal combustion engine to an electric field, wherein
 - a. the fuel line contains a liquid fuel having gas bubbles therein, and
 - b. the electric field generates plasma within the bubbles,with the fuel line subsequently providing the liquid fuel to a combustion chamber of the internal combustion engine.
 - 15 2. The plasma treatment method of claim 1 wherein the interior of the fuel line has obstacles formed therein within the path of fuel flow, whereby the length of the path of fuel flow is made greater than the corresponding length of the fuel line.
 3. The plasma treatment method of claim 1 wherein the solid surface area within the interior of the fuel line is greater than the solid surface area of the exterior of the fuel line.
 - 20 4. The plasma treatment method of claim 1 wherein the fuel line contains beads therein.
 5. The plasma treatment method of claim 4 wherein the beads are formed of catalytic materials.
 - 25 6. The plasma treatment method of claim 1 wherein the gas bubbles contain the liquid fuel in vaporized form.
 - 30 7. The plasma treatment method of claim 1 wherein the gas bubbles contain exhaust gas emitted by the internal combustion engine.

IPEMB5

PCT/US03/27645.07042004

8. The plasma treatment method of claim 1 further comprising the step of increasing the temperature of the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.

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9. The plasma treatment method of claim 1 further comprising the step of reducing the pressure of the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.

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10. The plasma treatment method of claim 1 further comprising the step of ultrasonically exciting the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.

June 15, 2005 Preliminary Amendment

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 10/526,798
Filing Date: 7 March 2005
Applicant(s): DENES et al.
Title:

Group Art Unit: Unknown
Atty. Docket: 09820377|P03049

PLASMA TREATMENT WITHIN DIELECTRIC FLUIDS

PRELIMINARY AMENDMENT (37 CFR §1.121/MPEP 714.01(e))

Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Prior to examination of the above-referenced application on the merits, please enter the amendments on the following pages.

I certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

6-15-05
Date of Deposit

6-15-05
Date of Signature

Marcia Layton
Signature

AMENDMENTS TO THE CLAIMS

1. **(ORIGINAL)** A plasma treatment method comprising the step of subjecting a portion of a fuel line for an internal combustion engine to an electric field, wherein
 - a. the fuel line contains a liquid fuel having gas bubbles therein, and
 - b. the electric field generates plasma within the bubbles,with the fuel line subsequently providing the liquid fuel to a combustion chamber of the internal combustion engine.
2. **(ORIGINAL)** The plasma treatment method of claim 1 wherein the interior of the fuel line has obstacles formed therein within the path of fuel flow, whereby the length of the path of fuel flow is made greater than the corresponding length of the fuel line.
3. **(ORIGINAL)** The plasma treatment method of claim 1 wherein the solid surface area within the interior of the fuel line is greater than the solid surface area of the exterior of the fuel line.
4. **(ORIGINAL)** The plasma treatment method of claim 1 wherein the fuel line contains beads therein.
5. **(ORIGINAL)** The plasma treatment method of claim 4 wherein the beads are formed of catalytic materials.
6. **(ORIGINAL)** The plasma treatment method of claim 1 wherein the gas bubbles contain the liquid fuel in vaporized form.
7. **(ORIGINAL)** The plasma treatment method of claim 1 wherein the gas bubbles contain exhaust gas emitted by the internal combustion engine.

8. **(ORIGINAL)** The plasma treatment method of claim 1 further comprising the step of increasing the temperature of the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.
9. **(ORIGINAL)** The plasma treatment method of claim 1 further comprising the step of reducing the pressure of the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.
10. **(ORIGINAL)** The plasma treatment method of claim 1 further comprising the step of ultrasonically exciting the liquid fuel to a degree sufficient to cause the gas bubbles to form in the liquid fuel.
11. **(NEW)** A plasma treatment method comprising the steps of:
 - a. situating a dielectric liquid having gas bubbles therein within an electric field which generates plasma within the gas bubbles; and
 - b. providing the dielectric liquid to the combustion chamber of an internal combustion engine.
12. **(NEW)** The plasma treatment method of claim 11 wherein the electric field is generated by spaced electrodes which are stimulated at a voltage and frequency sufficient to generate plasma within the gas bubbles.
13. **(NEW)** The plasma treatment method of claim 12 wherein the dielectric liquid is situated between the spaced electrodes.
14. **(NEW)** The plasma treatment method of claim 12 wherein the dielectric liquid is situated adjacent the spaced electrodes.

15. (NEW) The plasma treatment method of claim 11 wherein the gas bubbles contain the dielectric liquid in vaporized form.
16. (NEW) The plasma treatment method of claim 11 wherein the dielectric liquid is a hydrocarbon liquid.
17. (NEW) The plasma treatment method of claim 11 further comprising the step of increasing the temperature of the dielectric liquid to a degree sufficient to cause the gas bubbles to form in the dielectric liquid.
18. (NEW) The plasma treatment method of claim 11 further comprising the step of reducing the pressure of the dielectric liquid to a degree sufficient to cause the gas bubbles to form in the dielectric liquid.
19. (NEW) The plasma treatment method of claim 11 further comprising the step of ultrasonically exciting the dielectric liquid.
20. (NEW) The plasma treatment method of claim 11 further comprising the step of ultrasonically exciting the dielectric liquid to a degree sufficient to cause the gas bubbles to form in the dielectric liquid.

REMARKS

New claims 11-20 are added wherein claim 11 corresponds to original PCT claim 1 with original PCT claim 11 incorporated, and claims 12-20 correspond to original PCT claims 2-10. No new matter has been added to the application by these amendments, and the application is now ready for examination on the merits. If any questions regarding the application arise, please contact the undersigned attorney. Telephone calls related to this application are welcomed and encouraged. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

For the Applicant,



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